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EXAMINER : Michael Barr  
GROUP : 1762

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of:  
Alexander S. Kozlov, et al.

Docket: H16-26603

Serial Number: 09/611,182

Group Art Unit: 1762

Filed: July 6, 2000

Examiner: M. Barr

For: ELECTROLESS PLATINUM-RHODIUM ALLOY PLATING

RESPONSE TO OFFICE ACTION

Assistant Commissioner for Patents  
Washington, D.C. 20231

Sir:

In response to the Office Action mailed June 21, 2001, please consider the following remarks.

The Examiner has rejected claim 26 under 35 U.S.C. 112 for the reason stated in the office action. It is submitted that this ground of rejection is not well taken. Indeed, claim 26 does apply to a substrate immersed in an aqueous solution composition of the invention. However, Applicants respectfully assert that such does not render the claim vague and indefinite because of the plating of metal on the substrate over time. In claim 26, Applicants are claiming a substrate present in the claimed aqueous solution. The quantity of the plating composition that is deposited onto the substrate is irrelevant to the scope of the claim. Applicants are not claiming an infinite number of intermediate products, but only a single embodiment comprising a substrate within the claimed plating solution. Whether there is a small amount of plating or a large amount of plating is irrelevant. The claim encompasses each of these cases. This does not make the claim vague and indefinite. The claim addresses an intermediate which is clearly defined as an article comprising a substrate which is immersed in the indicated aqueous solution. Therefore, it is respectfully requested that the rejection be withdrawn.

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Applicants acknowledge that claims 5-6 and 8 have been indicated as allowable if rewritten in independent form including the limitations of the base claim.

The Examiner rejected claims 1-2, 4, 7, 9-21, 23 and 25-26 under 35 U.S.C. 103(a) over Rhoda et al. in view of Chang et al.; claim 3 under 35 U.S.C. 103(a) over Rhoda et al. and Chang et al. and further in view of JP 58204168; and claim 22 under 35 U.S.C. 103(a) over Rhoda et al. and Chang et al. and further in view of Ishihara et al. It is submitted that these grounds of rejection are not well taken.

Referring to the rejection of claims 1-2, 4, 7, 9-21, 23 and 25-26 under 35 U.S.C. 103(a) over Rhoda et al. in view of Chang et al., it is respectfully asserted that the rejection remains inappropriate. The invention provides a composition and process for electroless plating of a platinum-rhodium alloy onto substrates. The claimed composition comprises an aqueous solution of a water soluble, platinum nitrite salt or platinum amine-nitrite salt; a water soluble rhodium nitrite salt or rhodium amine-nitrite salt; ammonium hydroxide as a complexing agent; and hydrazine hydrate as a reducing agent. The claimed plating process utilizing the claimed plating composition is autocatalytic and deposits high purity platinum-rhodium alloy coatings on substrates of virtually any material and of any geometrical shape. The composition of this aqueous solution is essentially free of sulfur, phosphorus, chlorine and non-volatile components that cause impure plating, allowing for improved appearance and properties of the plated alloy. Further, the process generates essentially no hazardous substances and the absence of non-volatile components avoids the accumulation of byproducts that degrade the plating bath, allowing for virtually unlimited replenishment of the bath. Also, the composition of the plating bath allows metallic rhodium and platinum to be precipitated from the bath by boiling without undesirable contaminants.

Rhoda et al. disclose a bath and process for non-electrolytic deposition of platinum and platinum alloys onto a substrate. The bath disclosed may comprise an aqueous solution of an alkaline platinum IV hydroxide, hydrazine and sodium or optionally ammonium hydroxide. A rhodium salt, particularly ammonium rhodium III chloride, rhodium III nitrate, diammonium sodium

rhodium III chloride or ammonium rhodium III nitrite may be added to the bath to plate a platinum-rhodium alloy onto a substrate. Rhoda et al. do not disclose either a water soluble, platinum nitrite salt or platinum amine-nitrite salt. With regard to the dependent claims, the rhodium salts disclosed by Rhoda et al., are very different than the rhodium salts disclosed by Applicants. Applicants disclose rhodium salts of the formula  $M_z[Rh(NH_3)_x(NO_2)_{(6-x)}](NO_2)_y$  wherein  $x = 0$  to  $6$ ,  $y \geq 0$ ,  $z \geq 0$  and  $M$  comprises an alkali metal or  $NH_4^+$  cation, the cation preferably comprising sodium, potassium or ammonium  $NH_4^+$ . Also disclosed is triaminetris(nitrito-N,N,N)rhodium(III), or  $Rh(NH_3)_3(NO_2)_3$ , and diammonium sodium hexanitrorhodate (III), or  $(NH_4)_2Na[Rh(NO_2)_6]$ . The rhodium salts disclosed by Rhoda et al. are ammonium rhodium III chloride  $[(NH_4)_3RhCl_6]$  rhodium III nitrate  $[Rh(NO_3)_3]$ , diammonium sodium rhodium III chloride  $[(NH_4)_2NaRhCl_6]$  and ammonium rhodium III nitrite  $[(NH_4)_3Rh(NO_2)_6]$ .

Rhoda et al. do not disclose platinum salts within the scope of the invention, as admitted by the Examiner. The reference broadly discloses alkaline platinum IV hydroxide solutions, and only specifically discloses sodium platinum IV hydroxide  $[Na_2Pt(OH)_6]$ . These compounds are not within the scope of water soluble platinum nitrite salts or platinum amine-nitrite salts as disclosed by Applicants. Specifically, Applicants disclose platinum nitrite salts or platinum amine-nitrite salts having the formula  $M_z[Pt(NH_3)_x(NO_2)_{(4-x)}](NO_2)_y$  wherein  $x = 0$  to  $4$ ,  $y \geq 0$ ,  $z \geq 0$  and  $M$  comprises an alkali metal or  $NH_4^+$  cation. The cation is preferably sodium, potassium or ammonium  $NH_4^+$ . The preferred platinum compound disclosed is diaminebis(nitrito-N,N)platinum (II), or  $Pt(NH_3)_2(NO_2)_2$ , sometimes referred to as diaminedinitroplatinum, or P-salt, or diamineplatinum (II) nitrite; also existing as cis- and trans-isomers, both of which may be employed. None of the platinum compounds disclosed in the reference correspond to those specifically disclosed by Applicants, nor do they fall within the above formula.

The Examiner has applied Chang et al. to show the use of platinum as a platinum nitrite or amine-nitrite salt. Chang et al. disclose an electroless plating bath for plating spark plug tips with platinum, wherein the bath comprises a solution of platinum diamine dinitrite, hydrazine hydrate and ammonium hydroxide. The Examiner has maintained that it would be obvious to

one of skill in the art to use the platinum salt disclosed in Chang et al. with the disclosure of Rhoda et al., with the expectation of providing the desired electroless plating results, because such a platinum salt is conventionally used in electroless plating solutions with hydrazine hydrate and ammonium hydroxide. It is again submitted that such a conclusion is inappropriate in view of the applied art.

Applicants assert that while Chang et al. discloses the use of a platinum diamine dinitrite, there is no teaching or suggestion in the art to combine the platinum diamine dinitrite with a rhodium salt to form an electroless plating bath. More particularly, there is no teaching or suggestion to combine their platinum diamine dinitrite with a rhodium nitrite salt or rhodium amine-nitrite salt in solution with hydrazine hydrate and ammonium hydroxide to form a composition suitable to plate a platinum-rhodium alloy onto a substrate. Further, it is essential to recognize that not only is there nothing in the art to suggest a combination of these references to achieve the results of the claimed invention, but it is by no means conclusive that a combination of the teachings of these references would form a *compatible* solution having the stability of the presently claimed composition. Because one does not know, based on a reading of the Rhoda et al. reference, if their composition would be compatible with a solution having a platinum salt disclosed by Chang et al., it cannot be said that the claimed invention is obvious. Rather, the Examiner seems to be stating that it would be obvious for one skilled in the art to *try* and see if the platinum salt of Chang et al. would work with the solution of Rhoda et al. Applicants respectfully submit that such is an incorrect standard of patentability. The appropriate test of obviousness is whether or not one skilled in the art would recognize upon a reading of the applied references that the platinum salt from Chang et al. would be appropriate for use in the solution of Rhoda et al. to plate a platinum-rhodium alloy onto a substrate. To satisfy this test, it must be shown that there is a teaching or suggestion in the art to combine the references. Such motivation is not present in either of the references. Applicants further assert that requiring one skilled in the art to conduct experimentation to try and see if a particular platinum salt would be compatible with the solution of Rhoda et al. would place an undue burden on the person. Such an undue burden is indicative of non-obviousness.

The claimed plating composition is more stable than prior art solutions, generates essentially no hazardous substances and the absence of non-volatile components avoids the accumulation of byproducts that degrade the plating bath, allowing for virtually unlimited replenishment of the bath, and is essentially free of sulfur, phosphorus, chlorine and non-volatile components that cause impure plating, allowing for improved appearance and properties of the plated alloy. Moreover, the composition of the plating bath allows metallic rhodium and platinum to be precipitated from the plating bath by boiling without undesirable contaminants. The examiner indicates that if the applicant can provide a factual showing that the claimed platinum salt provides unexpected results over other platinum salts, then the rejection would be withdrawn. Applicants submit that they have no obligation to provide any such showing until and unless the examiner provides a valid prima facie case of obviousness. It is submitted that such a prima facie case of obviousness has not been made. The examiner has only show other, admittedly different salts and then leaps to the conclusion that the substitution would be obvious. A rejection on this basis is improper. The issue is not whether one skilled in the art could make such a substitution in light of applicant's disclosure, but rather whether such a substitution is fairly *suggested by* the applied art. Such is absent. The prior art materials are not analogs, homologs or isomers and therefore the hypothetical substitution is unwarranted. There is simply no suggestion from the art that the Chang, et al compounds could or should be substituted into Rhodia, et al. For these reasons, it is submitted that the claimed invention is would not be obvious to one skilled in the prior art upon a reading of Rhoda et al. and Chang et al., and it is requested that the rejection be withdrawn.

Regarding to the rejection of claim 3 under 35 U.S.C. 103(a) over Rhoda et al. and Chang et al. and further in view of JP 58204168, it is again respectfully asserted that the rejection is inappropriate. Rhoda et al. and Chang et al. have been discussed above and the arguments are repeated here. JP 58204168 discloses an electroless plating bath of rhodium and rhodium alloys. The bath comprises a rhodium salt having the formula  $[\text{Rh}(\text{NH}_3)_6]\text{X}_3$ , wherein X is a halogen,  $\text{NO}_2$ , etc., a hydrazine reducer, an hydroxyl amine salt, and optionally a platinum salt. Applicants disclose a composition including a rhodium nitrite salt or rhodium ammine-nitrite salt having the formula  $\text{M}_z[\text{Rh}(\text{NH}_3)_x(\text{NO}_2)_{(6-x)}](\text{NO}_2)_y$ , wherein  $x = 0$  to 6,  $y \geq 0$ ,  $z \geq 0$  and M comprises

an alkali metal or  $\text{NH}_4^+$  cation. Applicants again assert that there is no motivation in the art to combine the references to achieve the results of the claimed invention. The applied reference does not teach or suggest combining rhodium salts with a water soluble platinum nitrite salt or platinum amine-nitrite salt to form a composition as in the present invention. Additionally, similar to the discussion above, it is apparent that the Examiner is using an *obvious to try standard of patentability* to hypothesize that one skilled in the art would find it obvious to form an electroless plating composition of the present invention based on a reading of the applied art. Applicants disagree. Such is an incorrect standard of patentability. Further, it is respectfully submitted that the Examiner is employing an incorrect legal standard for patentability. The belief that one skilled in the art **could** form the claimed plating bath does not suggest that one **should** form such a film to obtain the disclosed benefits. Again, the examiner indicates that if the applicant can provide a factual showing that the claimed platinum salt provides unexpected results over other platinum salts, then the rejection would be withdrawn. Applicants submit that they have no obligation to provide any such showing until and unless the examiner provides a valid prima facie case of obviousness. It is submitted that such a prima facie case of obviousness has not been made. The examiner has only shown other, admittedly different salts and then leaps to the conclusion that the substitution would be obvious. A rejection on this basis is improper. The issue is not whether one skilled in the art could make such a substitution in light of applicant's disclosure, but rather whether such a substitution is fairly *suggested by* the applied art. Such is absent. The prior art materials are not analogs, homologs or isomers and therefore the hypothetical substitution is unwarranted. It is therefore requested that the rejection be withdrawn.

The Examiner has also repeated the rejection of claim 22 under 35 U.S.C. 103(a) over Rhoda et al. and Chang et al. as applied to Claim 11 above, and further in view of Ishihara et al. It is respectfully asserted that this ground of rejection is not well taken. Rhoda et al. and Chang et al. have been discussed above. Ishihara et al. discloses a conductive film circuit formed on an insulator substrate or semiconductor substrate whereby a metal or metal alloy, including a platinum-rhodium, alloy is deposited onto the substrate by coating or sputtering and then subsequently etched. It is again respectfully submitted that this reference is not applicable to the

present invention in that it does not relate to electroless plating of a substrate. The reference does not teach or suggest that semiconductor substrates are suitable for electroless plating techniques, nor electroless plating techniques as described by the present invention. Absent such a teaching or suggestion, the claim cannot be obvious in view of the applied references. Further in view of the differences between the claimed invention and the applied art discussed above, it is asserted that this reference is irrelevant to the patentability of the invention. The applicants again assert that the examiner is applying hindsight reasoning in forming the rejection. The examiner replies that any judgment of obviousness must be done with a hindsight reconstruction provided it takes into account the level of ordinary skill in the art. This is not the standard of patentability. There must be an affirmative suggestion from the art that the hypothetical reconstruction be made. An examiner cannot merely recognize the differences between the art and the claims and then leap to the conclusion that the differences could easily be foreseen by one skilled in the art. For these reasons it is requested that the rejection be withdrawn.

Should the examiner maintain the above rejections, Applicants call upon the examiner to provide a declaration under 37 CFR 1.104(a) concerning *facts* within his own knowledge concerning the level of ordinary skill in the art upon which he relies and exact how the conclusion is drawn that the differences between the claims and the applied prior art would be easily recognized by one of ordinary skill in the art.

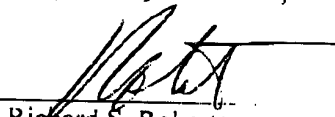
No matter how one applies or combines these references they do not teach the composition of the electroless plating bath of the claimed invention to attained the demonstrated benefits. It is submitted that the examiner is reconstructing the art in light of Applicants' disclosure. Where Applicants' teachings are needed to find the invention, the invention is not obvious. Applicants acknowledge the Examiner's statement that a judgment on obviousness must only depend on knowledge which was within the level of ordinary skill at the time of invention, and not depend on knowledge gleaned only from Applicants' disclosure. However, Applicants respectfully submit that one skilled in the art would not have the necessary knowledge to find the present invention obvious without first reading Applicants' disclosure, and that the Examiner has not made a determination of obviousness which is detached from knowledge of the presently claimed



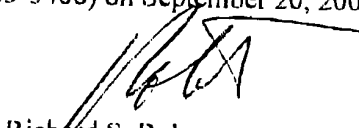
invention. Applicants respectfully submit that there is no suggestion from any reference that one should combine the references in order to achieve the inventive composition having the described benefits. Moreover, when selective combination of prior art references is needed to make an invention seem obvious, there must be something in the art to suggest that particular combination other than hindsight gleaned from the invention itself, something to suggest the desirability of the combination. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 5 U.S.P.Q.2d 1434, 1438 (CAFC 1988). Such a suggestion is absent in the cited references. For these reasons, and in light of the arguments above regarding Rhoda et al. and Chang et al., it is requested that this rejection be withdrawn.

The undersigned respectfully requests re-examination of this application and believes it is now in condition for allowance. Such action is requested. If the examiner believes there is any matter which prevents allowance of the present application, it is requested that the undersigned be contacted to arrange for an interview which may expedite prosecution.

Respectfully submitted,

  
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Date: September 20, 2001

I hereby certify that this paper is being facsimile transmitted to the Patent and Trademark Office (FAX No. 703-305-5408) on September 20, 2001.

  
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